Appl. No. 10/817,354
Response dated 09th June 2005
Communication in reply to Notice regarding Restriction dated 10-May-05

Amendment to the Specification:

Please replace the first paragraph of the specification, p. 1, lines 9-29 with the following:

In general, the present invention relates to techniques for producing nanoporous membranes, or arrays, utilizing anodization to create nanotubular structures for specialized applications. More-particularly, the invention is directed to unique electrical resistive devices for use to sense the presence of hydrogen gas having an array of titania nanotubes open at an outwardly-directed end, and mechanically supported by an integral support member comprised of one or more layers such as [[~~such~~]] an electrically insulative 'base' substrate layer, conductive foil substrate layer, metal-oxide layer(s), conductive metal layers deposited atop other layers (*e.g.*, atop an insulative layer), alumina nanoporous structure, and so on. Moreover, the electrical devices are adaptable for use to photocatalytically remove one or more contaminants from the array of titania nanotubes: By exposing the titania nanotube devices to radiant energy emitted over a preferred range of frequencies, namely radiation emitted from visible to ultraviolet (UV) frequencies, visible region is $\sim 4.0\times10^{14}$ Hz – 7.5×10^{14} Hz, corresponding to wavelengths within the range of 700 nm – 400 nm (UV region is λ = 400 – 300 nm, $f = 7.5\times10^{14}$ to 1.0×10^{15} Hz) in the presence of oxygen, contaminants such as liquid crude petroleum, pathogens (for example, virus and bacteria), organisms such as fungi (including yeast), and proteins may be removed from the nanotubes and further split into their molecular constituent(s). As will be appreciated, the photocurrent(s) generated within the nanotubular structures along with oxidation reaction, provides a 'self-clean' capability of the devices of the invention. This is extremely valuable in many environments, whether such contaminants are anticipated, for prolonging useful life of the electrical devices and for other related uses.

Amendment to the Specification (*continued*):

Please replace the paragraph text on p. 27, lines 10-22 (just prior to Eqn. (1)) with the following passage:

FIGs. 10a – 10b graphically depict, as voltammogram curves, taken in the dark and under illumination of a UV lamp providing radiant flux to the nanotube array(s), such as those depicted in FIGs. 9a – 9b. Photocatalysis is the phenomenon where light absorbed by a semiconductor generates highly reactive radicals, which then undergo redox reactions with chemicals on the surface of the semiconductor. TiO_2 is one of the best photocatalytic materials; it is also relatively inexpensive, stable and widely available. Two crystalline forms of TiO_2, anatase (band gap 3.2 eV) and rutile (band gap [[~~3.3~~]] 3.0 eV), are photocatalytically active, with anatase being more active than rutile. Photocatalytic activity is induced by incident photons of wavelength smaller than about 385 nm (ultraviolet range), which results in electrons from the valence band to be energized to the conduction band forming electron-hole pairs; these electron-hole pairs are responsible for the photocatalytic activity, as delineated in the following equations. Conduction band electron and valence band hole formation by incident UV light